

At spring tides high water comes about noon and midnight, and low water about six o'clock both morning and afternoon. At spring tides the tide has its greatest range and is therefore most noticeable while at neap tides the times of high and low water are difficult to determine. Apparently, therefore, the characteristics of the spring tides here have been taken as the average characteristics.

BOTANY.—*New plants from Central America.*—VII.¹ PAUL C. STANDLEY, U. S. National Museum.

The new species described on the following pages are mostly plants collected by myself in Costa Rica during the past two years. They include representatives of four South American genera now reported for the first time from North America: *Puya* and *Greigia* of the Bromeliaceae; *Ophiomeris*, a curious member of that small family, Burmanniaceae, related to the orchids; and *Panopsis*, of the Proteaceae. One of the new species described, a *Brunellia*, is a Mexican tree.

Several of the descriptions have been contributed by other writers—that of a Salvadorean *Agave* by Dr. William Trelease; those of three Panamanian Caesalpiniaceae by Dr. J. N. Rose; and those of a new *Scutellaria* and a *Mendoncia* by Mr. Emery C. Leonard.

Puya dasyliroioides Standl., sp. nov.

Plants large, terrestrial, 1–2.5 m. high; leaves mostly in a large dense basal cluster, stiff, 30–60 cm. long and larger, at base (above the sheaths) about 5 cm. wide, evenly tapering to the long-attenuate subulate apex, thick, finely striate, yellow-green, glabrous on the upper surface, beneath finely and closely whitish-lepidote; leaf-margins armed with sharp-pointed ascending blackish broad-based spinose teeth 4–5 mm. long and 1–4 cm. apart, the tip of the blade often unarmed; leaf-sheaths somewhat inflated but hard, dark brown, 7–8 cm. wide, the upper part of the sheath armed with minute close-set teeth; leaves of the stem similar to the basal ones but shorter, decreasing in size upward, the uppermost unarmed or nearly so and with thin brown papery sheaths; uppermost bracts of the stem 7–8 cm. long, much exceeding the internodes, loosely imbricate, abruptly acuminate into an ensiform blade 1.5–2 cm. long, sparsely arachnoid-villous with short whitish hairs; inflorescence spikelike, 30 cm. long or longer, 5–7 cm. thick, very dense and many-flowered; floral bracts similar to those of the stem but shorter, slightly exceeding the flowers, thin, dark brown, subulate-acuminate, short-villous; partial inflorescences few-flowered, about 3 cm. long, dense, the pedicels very thick, 1 cm. long, thinly brownish-tomentose; sepals 12 mm. long, ovate-

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oblong, narrowed to the obtuse apex, striate, thinly tomentose; capsule subglobose, 3-sulcate, about 12 mm. long and broad, rounded at base and apex, glabrous; seeds very numerous, the body blackish brown, 2 mm. long, longitudinally striate and pitted between the striae, the wing whitish.

Type in the U. S. National Herbarium, nos. 1,252,726-1,252,727, collected in the Laguna de la Chonta, northeast of Santa María de Dota, Province of San José, Costa Rica, altitude 2,100 meters, Dec. 18, 1925, by Paul C. Standley (no. 42334). Juvenile plants (no. 43653) collected in the paramos of the Cerro de las Vueltas, at 3,000 meters, probably are referable to the same species. I did not see any adult plants in the latter region.

Puya dasylirioides is the most conspicuous plant of the Laguna de la Chonta, which is a sphagnum bog of several acres, occupying probably an old crater, and inclosed on all sides by dense wet forest. The plants grow in great numbers everywhere except in the deep water, their tall stiff stems (all in fruit in December) suggesting mullein stalks. This lake is one of the most remarkable localities from a botanical standpoint that I have ever seen. It yielded a substantial number of curious plants that I have not found elsewhere in Costa Rica.

The genus *Puya*, represented in the high mountains of South America by over 40 species, has not been reported from North America. The Costa Rican plant, according to Mez's monograph, is related to the imperfectly known *P. Goudotiana* Mez, of Bogotá. The leaves, with their hard broad bases and narrow spine-margined blades, strongly suggest those of some species of *Dasylirion*. They show upon their faces the impressions of the spiny margins of the adjacent leaves, produced by mutual pressure in the dense rosette which they form, a feature characteristic of the genus *Dasylirion*.

Greigia sylvicola Standl., sp. nov.

Plants large, terrestrial, arising from elongate rootstocks, the stems stout, 1-1.5 m. high, densely leafy; leaves linear, 130 cm. long or shorter, 12-18 mm. wide, long-attenuate to the apex, somewhat dilated at base into a short, slightly inflated sheath 3-4 cm. wide; sheaths densely dotted with large, closely appressed, brown scales, the blades with a few minute brown scales but appearing glabrous, finely striate, thin, when fresh bright green; margins of the sheath unarmed, those of the blade just above the sheath (for 15-18 cm.) armed with numerous antrorse, dark brown, spinose teeth 1.5-3 mm. long and 8-22 mm. apart, the margins along the middle of the blade for the greater part of its length unarmed or with minute teeth, the apex of the blade for 20-25 cm. finely and densely spinose-serrate; inflorescence terminal, nearly hidden among the leaves, headlike, many-flowered, about 5 cm. long and broad, borne on a stout bracted stalk 4 cm. long; bracts equaling the sepals, green, linear-lanceolate to (outer ones) ovate, thin, long-acuminate, sparsely brown-lepidote, entire below, toward the apex densely serrate with coarse brown broad-based incurved teeth; flowers sessile; ovary turbinate, 3-angled, 10-15 mm. long, 5 mm. broad; sepals free, green, lanceolate, about 2 cm. long, long-acuminate, entire, spinose at apex, sparsely brown-lepidote; immature fruit about 1.5 cm. long and 1 cm. thick, many-seeded.

Type in the U. S. National Herbarium, no. 1,252,555, collected in forest near Laguna de la Escuadra, northeast of El Copey, Province of San José, Costa Rica, altitude about 2,200 meters, Dec. 16, 1925, by Paul C. Standley (no. 41975).

This bromeliad is frequent in the high mountains of the Cantón de Dota, but although locally abundant, fertile plants were found only once. The plants grow in the densest and wettest forest of oak and bamboo, usually in the darkest swamps or in running water, associated with begonias and Lobeliaceae. The following sterile specimens, all from the same region, are referred to this species:

COSTA RICA: Near Finca La Cima, above Los Lotes, alt. 2,400 m., Standley 42797. Laguna de la Chonta, northeast of Santa María de Dota, alt. 2,100 m., Standley 42357. Cerro de las Vueltas, alt. 3,000 m., Standley 44009.

The genus *Greigia* (Bromeliaceae) has not been reported north of Colombia. It consists of half a dozen species which range southward into Chile. The Costa Rican plant is related, according to description, to *G. albo-rosea* (Griseb.) Mez, of Venezuela, which has broader leaves and larger flowers

Vriesia disticha (L.) Standl.

Renealmia disticha L. Syst. Nat. ed. 10. 974. 1759.

Tillandsia heliconioides H. B. K. Nov. Gen. & Sp. 1: 234. 1815.

Pogomesia leiocalyx (Clarke) Standl.

Pogomesia Raf. (1836) is the oldest name for the genus of Commelinaceae to which the name *Tinantia* Scheidw. (1839) has been more generally applied. *Tinantia leiocalyx* Clarke, Bot. Gaz. 18: 211. 1893.

Pogomesia erecta (Jacq.) Standl.

Tradescantia erecta Jacq. Coll. Bot. 4: 113. 1790.

Tinantia erecta Schlecht. Linnaea 25: 185. 1852.

Agave compacta Trelease, sp. nov.

Section *Guatemalenses*. Acaulescent, not cespitose. Leaves gray-green, not transversely banded, fleshy, oblanceolate-obovate, upcurved above the thick contracted base, acuminate, plicate upwards, smooth, about 100 cm. long and 25 cm. wide; spine light brown, dull, smooth, straight, acicular, involutely grooved from above the middle with acute edges, decurrent for more than its own length, about 50 by 5 mm.; teeth brown, 10–20 mm. apart, scarcely 3 mm. long in the middle and reduced upwards and downwards, triangular from lenticular bases, nearly straight, the margin straight between them. Inflorescence densely paniculate, ovoid, 2.5 m. tall and half as broad, the scape about equaling the leaves, the horizontal branches few-parted at the end, their divisions very compactly flowered; pedicels scarcely 10 mm. long; flowers yellow, about 40 mm. long; ovary 20 mm. long, equaling the perianth, oblong; tube openly conical, about 5 mm. deep; segments 15 mm. long, shorter than the ovary; filaments inserted toward the throat, 35 mm. long, more than twice as long as the segments. Fruit unknown; freely bulbiferous.

Type in the U. S. National Herbarium, nos. 1,208,021–1,208,024, taken from a plant cultivated in the Patio de Ensayos, San Salvador, Salvador, by Salvador Calderón (no. 2251).

Unique in its short compact panicle, commencing at the height of the leaf tips.

***Heliconia Lankesteri* Standl., sp. nov.**

Plants of medium size for the genus, 1.5–2.5 m. high; petioles long and slender, glabrous, the sheaths glabrous, tinged with red; leaf-blades oblong-elliptic, about 75 cm. long and 25 cm. wide, abruptly short-acuminate, rounded at base, thin, glabrous, green on both surfaces; inflorescence erect, pedunculate, deltoid, about 30 cm. long and wide, glabrous throughout or nearly so, the rachis thick and stout, conspicuously zigzag, the internodes 1–3 cm. long; bracts about 16, slightly upcurved from near the base, cherry-red or dark yellow, long-attenuate to an obtuse tip, closely set, the upper basal margin of one bract nearly reaching the base of the next higher bract; lowest bract as much as 32 cm. long, the middle ones about 12 cm. long, strongly concave, the bases 1.5–2.5 cm. high; flowers numerous, dark yellow or red, 4.5 cm. long, glabrous; fruits pedicellate, partly exserted from the bracts, subglobose, about 1 cm. in diameter.

Type in the U. S. National Herbarium, nos. 1,228,683–1,228,684, collected in wet forest at La Estrella, Province of Cartago, Costa Rica, March 26, 1924, by Paul C. Standley (no. 39494). To this species may be referred the following additional collections:

COSTA RICA: Vicinity of Orosi, Prov. of Cartago, *Standley* 39927. Forests of El Copey, Prov. of San José, alt. 1,800 m., *Tonduz* 11821.

This plant is related to *H. adflexa* (Griggs) Standl. (*Bihai adflexa* Griggs)² a Guatemalan species which differs in its pubescent rachis and narrower, much more distantly spaced bracts.

The species is named for Mr. C. H. Lankester, in whose company I made the excursion to La Estrella, where the type was collected.

***Heliconia tortuosa* (Griggs) Standl.**

Bihai tortuosa Griggs, Bull. Torrey Club **30**: 650. 1903.

***Heliconia straminea* (Griggs) Standl.**

Bihai straminea Griggs, Bull. Torrey Club **42**: 327. 1915.

***Ischnosiphon elegans* Standl., sp. nov.**

Plants erect, 1–1.5 m. high, much branched, the branches slender; leaf sheaths 4–14 cm. long, conspicuously nerved, puberulent or glabrate; petioles 2.5 cm. long or less, the lower portion puberulent or scaberulous, the callus terete, glabrous; leaf-blades oblong-ovate, 6–17 cm. long, 3–6.5 cm. wide, abruptly acuminate, obtuse or rounded at base and usually abruptly contracted, thin, green, glabrous; spikes solitary, short-pedunculate, 20–25 cm. long, 6–8 mm. thick, the internodes about 2 cm. long, thinly pilose with

* Bull. Torrey Club **42**: 325. 1915.

short white hairs; bracts usually 10, lanceolate, 3.5–4 cm. long, acute, green, appressed or ascending, coriaceous, thinly pubescent, especially near the margins, finely nerved; flower 1 in each bract, sessile; ovary glabrous; bractlets oblong-linear, 2.3 cm. long, hyaline, rounded at apex and densely white-pilose; sepals narrowly linear, 2 cm. long, pilose; corolla white, the tube filiform, over 3 cm. long, white-pilose, the lobes 1 cm. long; capsule cylindric, 1.5 cm. long, pilose at apex; seed and aril together 12 mm. long, 3 mm. thick, smooth, mottled with light and dark brown, the aril 3 mm. long.

Type in the U. S. National Herbarium, no. 1,253,581, collected in moist forest near Tilarán, Guanacaste, Costa Rica, altitude 600 meters, January, 1926, by Paul C. Standley and Juvenal Valerio (no. 44251). The following additional collections, all from Guanacaste, illustrate the same species:

COSTA RICA: Tilarán, *Standley & Valerio* 46623. Naranjos Agrios, alt. 600 m., *Standley & Valerio* 46487, 46460. El Silencio, *Valerio* 64.

The only other Central American species, which grows in Panama, *I. leucophaeus* (Poepp. & Endl.) Koern., has large broad leaves, whitish beneath, and clustered spikes. The Costa Rican plant is related to *I. gracilis* (Rudge) Koern., of Brazil and the Guianas, a species with narrower leaves, more slender spikes, and seeds twice as large.

Ophiomeris panamensis Standl., sp. nov.

Plant hyaline, white, glabrous, the stem about 6 cm. long, 1.3 mm. thick, naked, subflexuous; flower solitary, terminal, 2 or 3-bracteate at base, the bracts lance-oblong to ovate, 1.5–3 mm. long, appressed; perianth campanulate, gibbous, 15 mm. long in its greatest length, about 10 mm. wide, at base abruptly narrowed, the orifice oblique, 8 mm. broad; corolla limb 6-parted, the 3 outer lobes short, ovate, and 3 inner ones about 3 cm. long, flexuous, filiform, dilated at base, spirally included in bud; stamens 6, equal, free, opposite the perianth lobes, the filaments deflexed, expanded into petaloid blades, these emarginate at apex; anthers small, 2-celled, the cells collateral, almost parallel, longitudinally dehiscent; ovary adnate to the perianth, free at apex and rounded, 1-celled, many-ovulate; style 1.5–2 mm. long, the 3 stigmas short, erect.

Type in the U. S. National Herbarium, no. 1,269,478, collected along the Pearson Trail on Barro Colorado Island in Gatún Lake, Canal Zone, Panama, July 11, 1925, by C. W. Dodge (no. 3484). Collected also along the Shannon Trail on the same island, July 17, 1925, *Dodge* 3460.

This is the first representative of the family Burmanniaceae, subfamily Thismieae, to be reported from tropical North America. One other member of the group, *Sarcosiphon americanus* (Pfeiffer) Schlechter, was found a few years ago near Chicago, a truly remarkable record, inasmuch as the other plants of the family are tropical in distribution.

The available material of the Panama plant is very scant, and the plant is so delicate that in the dried state it is difficult to determine its characters satisfactorily. According to the most recent treatment of the group, by Schlechter, it seems to agree best with the genus *Ophiomeris*, of which two species, both Brazilian, are known. In *O. macahensis* Miers the orifice of the perianth is small and lateral, while in *O. panamensis* it is merely oblique,

and much larger. In the latter, also, the anther cells are much less divergent than in the Brazilian species.

It is strange that this plant has not been found in Panama by other collectors, especially since Prof. Dodge states that it was plentiful on Barro Colorado in the summer of 1925. It may well be that it is an ephemeral plant, found only when conditions are exceptionally favorable, and having a growth period of very few weeks.

Myrica phanerodonta Standl., sp. nov.

Shrub 2.5-3.5 m. high, the older branches subterete, blackish, the young ones stout, sparsely or densely pubescent or glabrate, gland-dotted, densely leafy, the internodes about 1 cm. long; petioles stout, 2-6 mm. long, puberulent; leaf-blades obovate or oblong-obovate, 3-6 cm. long, 1.3-2.8 cm. wide, obtuse to rounded at apex, acuminate to broadly cuneate at base, coriaceous, serrate, the teeth about 10 on each side, salient, scarcely 1 mm. long, the blades deep green above, puberulent along the costa, slightly paler beneath, rather sparsely gland-dotted, puberulent on the prominent costa or glabrate, the lateral nerves very slender, plane or slightly elevated, straight or subarcuate, extending to the margin; staminate aments axillary, solitary, sessile, 10-18 mm. long, 4 mm. thick; anthers 1 mm. long.

Type in the U. S. National Herbarium, no. 799175, collected on the summit of the Volcán de Poas, Costa Rica, altitude 2,644 meters, November, 1896, by A. Tonduz (no. 10785). The following collections represent the same species:

COSTA RICA: Upper slopes of Volcán de Poás, *Standley* 34884. Cerro de Zurquí, Prov. Heredia, alt. 2,200 m., *Standley & Valerio* 50423.

Related to *M. parvifolia* Benth., of Colombia, which lacks the numerous salient teeth that mark the leaves of *M. phanerodonta*.

MYRICA PUBESCENS Willd. Sp. Pl. 4: 746. 1805.

Heretofore only a single species of *Myrica*, *M. mexicana* Willd. (*M. xalapensis* H. B. K.), has been known from Central America. This is a common and widely distributed plant, frequent in Costa Rica. It is strange that there has not been collected in Costa Rica long ago the Colombian *Myrica pubescens* Willd., a well-marked species, common in central Costa Rica, and occurring in the vicinity of both Cartago and San José, which are not exactly unexplored regions. The name "encinillo" is applied to the tree. The following collections of *M. pubescens* are in the National Herbarium:

COSTA RICA: Vara Blanca to La Concordia, *Maxon & Harvey* 8477. Río Reventado, Cartago, *Standley & Valerio* 49386. Between Aserri and Tarbaca, *Standley* 34058, 41356. Quebradillas, *Standley* 43018. Santa María de Dota, *Standley* 41574. Cerro de Piedra Blanca, above Escasú, *Standley* 32457, 32586.

Panopsis costaricensis Standl., sp. nov.

Large shrub or tree, 5-10 m. high, the branchlets glabrate, densely leafy, brownish, bearing numerous pale elevated lenticels; leaf buds densely ferruginous-sericeous; petioles stout, 4-10 mm. long, glabrous; leaf-blades oblanceolate-oblong or obovate-oblong, 6-20 cm. long, 2-6 cm. wide, obtuse

or rounded at apex, cuneately narrowed at base, subcoriaceous, lustrous, entire, concolorous or when dry sometimes brownish beneath, the venation conspicuous on both surfaces, coarsely reticulate, the principal lateral nerves about 6 on each side, very irregular; flowers yellowish white, racemose, the racemes few, forming a terminal panicle, the rachises 8–13 cm. long, many-flowered, floriferous nearly to the base, thinly pilose with minute, mostly appressed, brownish hairs; bracts linear-subulate, about 6 mm. long; pedicels divaricate, slender, 3–4 mm. long, pubescent like the rachis; perianth lobes linear, 5–6 mm. long, pilose outside with sparse minute appressed hairs; hypogynous scales united to form a membranaceous 4-denticulate cup about 0.6 mm. high; ovary densely brown-hirsute; style 4 mm. long, glabrous, clavate at apex; fruit broadly ovoid, only slightly asymmetric, subsessile, about 4.5 cm. long and 3 cm. in diameter, obtuse at base, abruptly contracted to the large mammiliform apex, smooth, glabrous.

Type in the U. S. National Herbarium, no. 861785, collected on hills of Santiago, near San Ramón, Costa Rica, in flower, May 1, 1901, by A. M. Brenes (no. 14303). The following additional collections are referred here:

COSTA RICA: Fraijanes, Prov. Alajuela, alt. 1,600 m., *Standley & Torres* 47440. La Ventolera, on the southern slope of Volcán de Poás, alt. 1,700 m., *Standley* 34567.

The other species of *Panopsis* are South American, this being the first one reported for North America. The Costa Rican tree resembles in foliage characters Bolivian specimens collected by Bang and distributed as *P. Sprucei* Meisn., but the Bolivian species has a much shorter style and copious pubescence on branches and leaves.

***Brunellia costaricensis* Standl., sp. nov.**

Medium-sized tree with rounded crown, the branchlets stout, glabrous or at first very sparsely pilose; leaves opposite, pinnate, the leaflets 7 to 10 (terminal leaflet often absent), the petiole and rachis together 8–28 cm. long, stout, subterete, glabrous; petiolules stout, 8–14 mm. long, shallowly sulcate above, glabrous; leaflets oblong, 7.5–13.5 cm. long, 2.5–5.5 cm. wide, rounded or obtuse at apex and abruptly short-cuspidate (cusp 5–6 mm. long, obtuse), at base broadly rounded to obtuse, somewhat unequal, remotely and very shallowly appressed-crenate, coriaceous, deep green above, glabrous, beneath pale, when very young rather densely sericeous with minute, closely appressed hairs, but soon glabrate, the costa impressed above, salient beneath, the lateral nerves very prominent beneath, 15–18 pairs, ascending, nearly straight, extending to the margin; panicles axillary, rather dense, many-flowered, about 16 cm. broad, much branched, pedunculate, the branchlets densely pilose with minute, ascending or subappressed hairs, the pedicels stout, 4–6 mm. long, jointed below the middle; calyx lobes 5, ovate to elliptic-oblong, 2–2.5 mm. long, acute or acutish, minutely sericeous on both surfaces; carpels of the fruit 4 or 5, when fully mature 3 mm. high, sessile, densely and minutely sericeous, the stout style lateral; seeds dark red-brown, very lustrous, smooth, 2.5 mm. long.

Type in the U. S. National Herbarium, no. 1,306,244, collected in wet forest at Yerba Buena, northeast of San Isidro, Province of Heredia, Costa Rica, altitude about 2,000 meters, February, 1926, by Paul C. Standley

and Juvenal Valerio (no. 49900). The species is represented by the following additional collections:

COSTA RICA: Yerba Buena, *Standley & Valerio* 49951. La Palma, alt. 1,460 m., *Tonduz* 12605 (*J. D. Smith* 7412).

This Costa Rican *Brunellia*, the only representative of the genus known from Central America, has been determined as *B. comocladifolia* Humb. & Bonpl., a species of Colombia and the Greater Antilles. The Colombian tree is strikingly different in its nearly sessile leaflets which are softly pubescent beneath with dense spreading fulvous hairs. Its carpels, also, are hispidulous.

***Brunellia mexicana* Standl., sp. nov.**

Tree, the young branches stout, terete, glabrous, with short internodes; leaves opposite, pinnate, the leaflets 11 to 17, the petiole and rachis together 11–50 cm. long, slender, terete, glabrous or puberulent; petiolules 2–4 mm. long, puberulent or glabrous; leaflets oblong or lance-oblong, 6–14 cm. long, 2–4.5 cm. wide, acuminate or long-acuminate, at base somewhat oblique, rounded to obtuse, appressed-serrulate, subcoriaceous, deep green on the upper surface, short-pilose with appressed hairs along the nerves or glabrous, the costa impressed, beneath glaucous, when young velvety-pubescent, the pubescence in age mostly deciduous except along the nerves, the costa and lateral nerves prominent beneath, the latter about 19 pairs, arcuate, extending to the margin; panicles solitary in the leaf axils, about 15 cm. broad, densely many-flowered, the peduncles elongate, compressed, the branches densely tomentose; pedicels 4–7 mm. long, jointed near the base; calyx lobes 5, oblong-ovate, 2.5 mm. long, acutish, tomentulose on both surfaces, spreading in fruit; carpels of the fruit 4 or 5, at maturity 5 mm. long, compressed, the short stout style nearly basal, the carpels densely tomentose and hispid with short stiff hairs; seeds 2 mm. long, dark brown, scarcely lustrous.

Type in the U. S. National Herbarium, no. 1,265,699, collected at Tecamatla, Veracruz, Mexico, October, 1925, by C. A. Purpus (no. 10454).

The same species was collected in Oaxaca by Galeotti (no. 7247).

Brunellia mexicana is much closer to *B. comocladifolia* than to *B. costaricensis*. The Colombian species differs in the broader-based leaflets, green beneath and with prominent-reticulate secondary venation, and in the much smaller carpels. The pale under surface of the leaflets of *B. mexicana* is caused, perhaps, by a microscopic tomentum, or possibly by a waxy exudate.

***Bauhinia Standleyi* Rose, sp. nov.**

Large woody vine, the stem often flattened and then 5 cm. or more broad; young branches with dense brown pubescence; tendrils slender, hairy; stipules small, broadly ovate to orbicular, 2 mm. long, hairy below, glabrous above, caducous; petiole 2–3 cm. long; leaf-blades broader than long, 3–5 cm. long, 2-lobed, sometimes cleft below the middle, the lobes rounded, 7 to 9-nerved, dull green, softly pubescent on both sides; inflorescence terminal, 4–5 cm. long, many-flowered, pubescent; bracts linear; pedicels slender, 10 mm. long or less, bearing 1 or 2 linear bractlets; calyx cup-shaped, 4–5 mm. long, the lobes 1–3 mm. long, linear; petals 5, very hairy below, 10–

12 mm. long, erect, greenish white, one of them with small purple spots; perfect stamens 10, glabrous; pods broadly spatulate, 6–7 cm. long, 2 cm. broad near the top, in age glabrate.

Type in U. S. National Herbarium, no. 1,152,798, collected by Paul C. Standley, near Punta Paitilla, Province of Panama, Panama, December 7, 1923 (no. 26247). The following collections represent the same species:

PANAMA: Taboga Island, *Macbride* 2800; *Standley* 27908. Ancón, *Piper* 6031. Along the Corozal Road near Panama, *Standley* 23776. Around El Paraíso, Canal Zone, *Pittier* 2577. Vicinity of Penonomé, *Williams* 134.

Cassia Killipii Rose, sp. nov.

Procumbent herb with long slender branches, often 1 meter long, the short pubescence interspersed with spreading hairs and more or less viscid; stipules minute; leaflets 2 pairs, orbicular to short-oblong, 5–10 mm. long, rounded at apex, glabrous above or nearly so, pubescent beneath, strongly veined; flowers axillary and solitary or somewhat paniculate above; flower bud obtuse, densely long-setose; sepals 8–9 mm. long, obtuse; petals 11–13 mm. long, brick-red; ovary densely setose; fruit setose, 2.5 cm. long, 5 mm. broad.

Type in the U. S. National Herbarium, no. 1,266,850, collected by E. P. Killip near the Tapia River, Province of Panama, Panama, December 9, 1917 (no. 3281). The following specimens are referable to this species:

PANAMA: Vicinity of Penonomé, *Williams* 104. Between Paso del Arado and Olá, Prov. Coclé, *Pittier* 5014. Along the Río Tapia, Prov. Panama, in savanna or on grassy slopes, *Standley* 28186, 30656.

Cassia pallidior Rose, sp. nov.

Low shrub, glabrous or nearly so; leaflets 12 pairs or fewer, narrowly oblong to orbicular, 1.5–3.5 cm. long, a little hairy when young but soon glabrate, very pale beneath, apiculate; stipules linear, caducous; gland between the lowest pair of leaflets large, clavate; inflorescence 2-flowered; peduncles and pedicels slender; flowers large; sepals thin, orbicular; petals orbicular to short-oblong, sometimes 3 cm. long; 3 of the anthers with long slender beaks; pod 12–15 cm. long, 5–6 mm. broad.

Type in the U. S. National Herbarium, no. 676,583, collected by H. Pittier near Alhajuela, Panama, January, 1914 (no. 2343). The following collections also belong to this species:

PANAMA: Sabana de Alhajuela, *Pittier* 3465.

COSTA RICA: Río Virilla, Prov. San José, *Tonduz* 9824 (*J. D. Smith* 7007), 12714 (*J. D. Smith* 7437).

Tephrosia Heydeana (Rydb.) Standl.

Cracca Heydeana Rydb. N. Amer. Fl. 24: 166. 1923.

Pavonia fruticosa (Mill.) Standl.

Sida fruticosa Mill. Gard. Dict. ed. 8. *Sida* no. 18. 1768.

Pavonia typhalea Cav. Diss. Monad. 3: 134. 1787.

Pavonia Preslii Standl., nom. nov.

Malachra ovata Presl, Rel. Haenk. 2: 125. 1835. Not *Pavonia ovata* Spreng. 1826.

Pavonia panamensis Standl.

Malache panamensis Standl. Contr. U. S. Nat. Herb. 18: 116. 1916.

Hybanthus guanacastensis Standl., sp. nov.

Shrub 1.5–4.5 m. high, the branches densely leafy, the older ones slender, terete, grayish, the young ones sparsely or densely puberulent; stipules 2.5–3 mm. long, broadly ovate, glabrous, the costa and basal portion indurate, the costa excurrent as a subulate mucro, the margins scarious, whitish, ciliolate; petioles 2–5 mm. long, glabrous; leaf-blades oblong to oblong-elliptic, 4–10 cm. long, 1.5–4.5 cm. wide, acute to long-acuminate, at base rounded to acutish and conspicuously oblique, thin, glabrous, rather remotely and irregularly serrate-dentate, the teeth callous-tipped, the venation prominent on both surfaces; flowers axillary, solitary, the pedicels 6–10 mm. long, slender, glabrous, jointed above the middle; sepals ovate, 2 mm. long, acute or obtuse, thin, greenish, glabrous but ciliolate; lower petal 6 mm. long, panduriform, broad and inflated at base, constricted above, then expanded into a short broad truncate blade, glabrous, the upper petals 4 mm. long; filaments broad, about equaling the villous anthers, the connective expanded into a large thin quadrate appendage; immature capsule 6 mm. long, orbicular, glabrous, rounded at apex, the persistent style 2 mm. long.

Type in the U. S. National Herbarium, no. 1,254,104, collected in wet mountain forest at Los Ayotes, near Tilarán, Guanacaste, Costa Rica, altitude about 700 meters, January 21, 1926, by Paul C. Standley and Juvenal Valerio (no. 45423). To the same species are referred the following collections from Guanacaste:

COSTA RICA: Quebrada Serena, *Standley & Valerio* 46161, 46197. Los Ayotes, *Standley & Valerio* 45346.

Related to *H. mexicanus* Ging., which has flowers only half as large on much shorter pedicels.

Hybanthus tenuifolius (Dowell) Standl.

Calceolaria tenuifolia Dowell, Bull. Torrey Club 33: 550. pl. 18. 1906.

Hybanthus longipes (Dowell) Standl.

Calceolaria longipes Dowell, Bull. Torrey Club 33: 551. pl. 19. 1906.

Hybanthus glaber (Dowell) Standl.

Calceolaria glabra Dowell, Bull. Torrey Club 33: 552. pl. 20. 1906.

Hybanthus brevis (Dowell) Standl.

Calceolaria brevis Dowell, Bull. Torrey Club 33: 552. pl. 21. 1906.

Hybanthus angustifolius (H. B. K.) Standl.

Ionidium angustifolium H. B. K. Nov. Gen. & Sp. 5: 377. 1821.

Hybanthus riparius (H. B. K.) Standl.*Ionidium riparium* H. B. K. Nov. Gen. & Sp. 5: 378. 1821.**Hybanthus nigricans** (Dowell) Standl.*Calceolaria nigricans* Dowell, Bull. Torrey Club 33: 554. 1906.**Hybanthus humilis** (Rose & Dowell) Standl.*Calceolaria humilis* Rose & Dowell, Contr. U. S. Nat. Herb. 10: 125. pl. 42. 1906.**Hybanthus Rosei** (Dowell) Standl.*Calceolaria Rosei* Dowell, Bull. Torrey Club 33: 555. pl. 22. 1906.**Xylosma Hemsleyana** Standl.*Hisingera elliptica* Clos, Ann. Sci. Nat. IV. 8: 226. 1857.*Xylosma elliptica* Hemsl. Biol. Centr. Amer. Bot. 1: 57. 1879. Not *X. elliptica* Tul. 1868.**Symplocos Johnsonii** Standl., sp. nov.

Tree 18 m. high, the branchlets subterete, glabrous, bearing few large elevated lenticels; petioles stout, 12–18 mm. long, broadly channeled above, glabrous; leaf-blades oblong or elliptic-oblong, 11.5–22 cm. long, 4.5–8 cm. wide, abruptly acute, with obtuse tip, acute or acuminate at base, subcoriaceous, entire or essentially so, glabrous, lustrous above, the costa impressed above, prominent beneath, the lateral nerves very slender, about 14 on each side, arcuate-ascending, laxly anastomosing near the margin; inflorescence few-flowered, dense and congested, the flowers sessile; calyx-tube 2 mm. long, glabrous, the lobes broadly rounded, 2 mm. long, minutely ciliate, otherwise glabrous; corolla 16 mm. long, the tube 8–9 mm. long, 2.5 mm. thick, the 5 lobes obovate or oblong, rounded at apex, glabrous; stamens very numerous, free above, equaling the corolla lobes, the filaments connate into a tube, very unequal, finely and densely papillose, not collected in recognizable fascicles, stout, abruptly contracted near the apex into a very slender tip; style 16 mm. long, densely hirsute below.

Type in the U. S. National Herbarium, no. 1,081,463, collected at Samac, Alta Verapaz, Guatemala, altitude 1,350 meters, October 20, 1920, by Harry Johnson (no. 874).

This species belongs to Brand's section *Symplocastrum*, subsection *Pseudoalstonia*, and in his key to the group, in the Pflanzenreich, runs at once to *S. quindiuensis*, of Colombia. That species has much smaller leaves and a smaller corolla. Among the Central American species, *S. Johnsonii* is conspicuous because of its large leaves.

The collector reports that the flowers are rose-pink and very fragrant. It is a pleasure to be able to name this fine species for Mr. Johnson, who obtained in Alta Verapaz in 1920 one of the most interesting and most carefully prepared collections of plants ever made in Guatemala.

Chelonanthus alatus (Aubl.) Standl.*Lisianthus alatus* Aubl. Pl. Guian. 204. 1775.

Scutellaria argentata Leonard, sp. nov.

Tall slender herb (only the upper portion of plant available for study); stem dark purplish, glandular-pubescent; petioles 1–1.5 cm. long, densely glandular-puberulent; leaf-blades oblong-elliptic or oblong-obovate, obscurely panduriform, acuminate at apex, narrowly cordate at base, rather coarsely serrate with flat teeth, both surfaces bearing shiny silver dots, glabrous except the glandular-puberulent midrib and veins of the lower surface, the veinlets inconspicuously reticulate; flowers numerous, crowded in a terminal raceme about 8 cm. long; rachis strongly glandular-puberulent; bracts linear, 2–3 cm. long, about 0.5 mm. broad, obtuse, deciduous; pedicels 2–2.5 mm. long, glandular-puberulent; calyx 4 mm. long, the lobes reddish purple, glandular-pubescent, the crest small; corolla bright crimson, sparingly pubescent, 4–5 cm. long, the tube slender, 4 mm. broad at throat, gradually narrowed to 2 mm. at base, the upper lip much larger than the lower, the middle lobe rounded, deeply emarginate, curving over the stamens, the lateral lobes short, oblong, 25 mm. long, 8–9 mm. broad, the lower lip triangular, rounded, shallowly notched at apex; stamens didynamous, curved at tip, glabrous, the upper pair 2 mm. longer than the lower, the anthers of the upper pair 1-celled, oval, 1.25 mm. long, 0.75 mm. broad, those of the lower pair 2-celled, broadly ovate, 1.25 mm. long and broad, cordate at base, slightly emarginate at apex; style equaling the upper pair of stamens, curved at tip, glabrous, the stigma unequally 2-lobed, the lobes spreading; ovary glabrous, on a conical gynobase 1 mm. long and 1.5 mm. broad at base; nutlets not seen.

Type in the U. S. National Herbarium, no. 1,266,817, collected at La Florida, Costa Rica, in 1925, by C. H. Lankester.

This attractive plant is well marked by its long slender crimson flowers, glandular pubescence, and silvery-punctate leaves. The slightly panduriform leaf-blades suggest a relationship with *S. costaricana*, but that species can be separated easily by its smaller corolla and eglandular pubescence.

Gonzalagunia rudis Standl.

Duggena rudis Standl. Contr. U. S. Nat. Herb. **18**: 125. 1916.

Since there is some doubt as to the identity of the plant described as the type of the genus *Duggena*, it is preferable to use for this group of Rubiaceae the next older name, *Gonzalagunia*.

Pentagonia pubescens Standl.

Watsonamra pubescens Standl. Contr. U. S. Nat. Herb. **17**: 441. 1914.

The generic name *Pentagonia* Benth. has been rejected because of *Pentagonia* Vent. (1841), but the latter does not seem to be effectively published.

Pentagonia Donnell-Smithii Standl.

Watsonamra Donnell-Smithii Standl. Contr. U. S. Nat. Herb. **17**: 442. 1914.

Pentagonia Pittieri Standl.

Watsonamra Pittieri Standl. Contr. U. S. Nat. Herb. **17**: 443. 1914.

Pentagonia brachyotis Standl.

Watsonamra brachyotis Standl. Contr. U. S. Nat. Herb. **17**: 443. 1914.

Pentagonia gymnopoda Standl.

Watsonamra gymnopoda Standl. Contr. U. S. Nat. Herb. **17**: 444. 1914.

Pentagonia alfaroana Standl.

Watsonamra alfaroana Standl. Journ. Washington Acad. Sci. **15**: 287. 1925.

Cephaelis nana Standl.

Evea nana Standl. Journ. Washington Acad. Sci. **15**: 105. 1925.

PROCEEDINGS OF THE ACADEMY AND AFFILIATED SOCIETIES

THE PHILOSOPHICAL SOCIETY

947TH MEETING

The 947th meeting, constituting the 56th annual meeting, was held in the Cosmos Club auditorium on December 11, 1926. It was called to order by President BOWIE at 8:19, with 46 persons present.

The report of the Treasurer showed total receipts, \$1753.08; disbursements, \$1207.73, leaving a balance of \$545.35. The report of the secretaries showed that 19 meetings were held during the year, several in conjunction with other societies.

The following officers were elected for the year 1927: *President*, J. P. AULT; *Vice-Presidents*, L. H. ADAMS and P. R. HEYL; *Treasurer*, W. D. LAMBERT; *Recording Secretary*, H. E. MERWIN; *Member-at-Large*, *General Committee*, O. S. ADAMS.

At the conclusion of the business meeting, Mr. L. H. ADAMS presented an address entitled *What we know about the interior of the earth* (Illustrated by lantern slides). The outer parts of the earth have been thoroughly explored, at the surface and to a depth of a mile or so, but the sum total of our knowledge of the deeper parts of the earth is not very large. And yet the mysteries are slowly being solved. From varied sources information has been gathered and pieced together to form a picture of earth's interior—a picture as yet crude and imperfect but one which is gradually being made clearer and more complete.

Volcanoes bring up material from considerable depths and show us that beneath the cooler surface is a hot and active interior; the amount of radioactive substance found in ordinary rocks indicates that unless the earth is, and always has been, growing hotter, the interior must be of a very different composition from that of the surface layers; geological studies have given us a store of information concerning the structure and composition of the rocks found at the surface and allow us to make certain deductions as to the way in which the character of the rocks should vary with depth; laboratory measurements on gravitational attraction tell us the density of the earth as a whole and indicate the presence of very dense material at the center; astronomical data on the motion of the earth give us the moment of inertia of the